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# New Taxa and Combinations in *Eleutherococcus* (Araliaceae) from Eastern Asia

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**ABSTRACT.** While preparing a monographic study of *Eleutherococcus*, we discovered the three new taxa, *E. brachypus* var. *omeiensis*, *E. huangshanensis*, and *E. pseudosetulosus*, described here. In addition, three new combinations, *E. divaricatus* var. *chiisanensis*, *E. pilosulus*, and *E. pubescens*, are proposed.

*Eleutherococcus* Maximowicz (1859, emend. C. H. Kim & B.-Y. Sun) is an endemic Asian genus with about 35 species distributed mainly in northeastern Asia including China, Korea, and Japan, with some members also extending to southwestern Asia (Kim, 1997). The genus *Acanthopanax* (Decaisne & Planchon) Witte was initially recognized as a subgenus of *Panax* L. by Decaisne and Planchon (1854) and raised to generic rank by Witte (1861). Harms (1894) combined the two genera, and adopted the name *Acanthopanax*, which has since been widely used by many botanists. However, *Acanthopanax* does not have priority and is therefore illegitimate under current ICBN nomenclature (Greuter et al., 1994). Some recent authors (e.g., Hu, 1980; Ohashi, 1987; Hsu & Pan, 1993) have therefore transferred taxa from *Acanthopanax* to *Eleutherococcus*.

Plants of *Eleutherococcus* are shrubs and are characterized by the presence of prickles, five-merous flowers with two to five carpels, and palmately compound leaves. The genus as a whole is highly variable resulting in much taxonomic confusion (Kim, 1997). For example, *E. koreanus* Nakai was distinguished from *E. senticosus* (Ruprecht & Maximowicz) Maximowicz based on its unarmed twigs. However, examination of specimens from various regions has shown this character to be merely included within the limits of natural variation among individuals. While preparing a monographic study of *Eleutherococcus*, we found three new taxa and describe them here: *E. brachypus* var. *omeiensis*, *E. huangshanensis*, and *E. pseudosetulosus*; three new combinations are also made: *E. divaricatus* var. *chiisanensis*, *E. pilosulus*, and *E. pubescens*.

***Eleutherococcus brachypus*** (Harms) Nakai var. ***omeiensis*** C. H. Kim & B.-Y. Sun, var. nov.  
TYPE: China. Sichuan: Omei Hsien, Mt. Omei, 10 Oct. 1940, T. C. Lee 3794 (holotype, US; isotype, A).

Foliola 3, terminalia foliola elliptica, glabra; terminales petioluli ca. 1 cm longi, glabri. Flores cum pedicellis articulatis.

A hermaphroditic shrub to 2 m tall; stems erect, glabrous. Leaves 3-foliolate, leaflets elliptic, somewhat chartaceous, glabrous on both surfaces, secondary veins 3 to 5 pairs, the apex obtuse or acuminate, the margin entire, the base cuneate; petiole 0.5 cm long, glabrous; terminal leaflets 2–4 × 1–1.5 cm, petiolule relatively long, ca. 1 cm; lateral leaflets somewhat smaller than terminal ones, sessile or short-petiolulate. Inflorescence of umbels arranged in a simple cyme at the end of long branches of the current year's growth, rarely at the end of short branches, glabrous; pedicel articulated at uppermost part, 1–1.5 cm long, glabrous. Calyx 5-toothed; petals 5; stamens 5; carpels 5, style united into a single column, stigma indistinctly 5-lobed, ca. 1 mm long; ovary 2 mm long. Fruit unknown.

This variety is thus far known only from Mt. Omei, Sichuan, China, from which the epithet was derived. The typic variety occurs in Gansu, Shanxi, and Shaanxi in China. *Eleutherococcus brachypus* var. *omeiensis* differs from other members of the genus by its articulation in the uppermost part of the pedicel. This variety is also distinguished from the typic variety in having a long (ca. 1 cm) petiolule on the terminal leaflet. Other features are the same and hence we recognize it as a variety of *E. brachypus*.

***Eleutherococcus divaricatus*** (Siebold & Zuccarini) S. Y. Hu var. ***chiisanensis*** (Nakai) C. H. Kim & B.-Y. Sun, comb. et stat. nov. Basionym: *Acanthopanax chiisanensis* Nakai, J. Arnold Arbor. 5: 5. 1924. TYPE: Korea. Cheju-do: in silvis Yongsil 1000 m, *E. Taquet* 890 (lectotype, selected here, C; isolectotypes, A, E).

*Eleutherococcus divaricatus* var. *chiisanensis* differs from the typical variety in having setose trichomes on its abaxial leaf surface rather than exclusively sericeous indumentum. In variety *chiisanensis*, these setose trichomes are often mixed with sericeous ones in varying degrees. Other morphological features are the same, and hence we recognize this taxon as a variety of *E. divaricatus*. It is endemic to the Korean peninsula, whereas the typical variety occurs in Hokkaido, Honshu, Shikoku, and Kyushu in Japan and Shanxi, Henan, and Zhejiang in eastern China. Among the syntypes (*E. Taquet 890*, *E. Taquet 889*, *E. Taquet 5660*, and *T. Nakai 369*), the first, here selected as the lectotype, has relatively well-preserved leaf indumentum and distinct pedicels in umbels, which are diagnostic characters.

*Representative specimens.* KOREA. **Cheju-do:** in silvis Yongsil 1000 m, 17 Aug. 1918, *E. Taquet 889* (A, C, E, TI); in silvis Yongsil 1000 m, *E. Taquet 5660* (E); Yongshil 1100 m hill, 18 Sep. 1995, *B. Y. Sun s.n.* (JNU [5 sheets]). **Chollabuk-do:** Mt. Unjang, 6 Aug. 1994, *C. H. Kim 5044* (JNU [8 sheets]). **Chollanam-do:** Mt. Chiri, 1 July 1913, *T. Nakai 369* (TI); Chirisan (Mt. Chiri), Aug. 1934, *R. K. Smith s.n.* (US); Mt. Chiri, Nogodan, 11 Aug. 1988, *C. H. Kim 5011* (JNU [8 sheets]). **Hamgyungbuk-do:** Myungchon-gun, Sanggo-myon, Chilbosan, 19 Aug. 1924, ? 114 (TI). **Hamgyungnam-do:** Sam-su District, Onkol-muri valley, 8 Aug. 1887, *V. Komarov 1148* (BM); Hogen, yutenji, Hongo-san, 7 July 1918, *E. H. Wilson 10494* (A). **Kangwon-do:** Mt. Odae, 17 Aug. 1988, *C. H. Kim 5042* (JNU [2 sheets]); Inje-gun, Daeamsan, 28 Sep. 1969, *Y. M. Kang 44755* (SNU); Daekwalyung, Neugchongsan, 22 Aug. 1969, *T. B. Lee & M. Y. Cho s.n.* (SNUA). **Kyungsangbuk-do:** without precise locality, 13 Sep. 1938, *T. H. Chung 9556* (SNU).

***Eleutherococcus huangshanensis*** C. H. Kim & B.-Y. Sun, sp. nov. TYPE: China. Anhui: Mt. Wangshan, 19 Oct. 1933, *W. C. Cheng 4146* (holotype, SING; isotypes, BM, US). Figure 1.

Frutex erectus; ramulis glabris; internodio sparsis triangulis non-elasticis aculeis, ca. 0.5 cm longis, ca. 0.2 cm latis; foliola 5, supra et subtus glabra, duplicato-serrata. Umbellae (inflorescentiae) glabres.

A hermaphroditic shrub to 5 m tall; stems erect, glabrous with scattered prickles, sometimes a single prickle at a node or below the petiole. Prickles non-elastic and stout, 0.5 cm long, 0.2 cm wide, sharp-pointed with a broadened and enlarged base, pointing downward; the base narrowly elliptic, 1 cm long. Leaves 5-foliolate, blade widely elliptic or ovate, ca. 10 × 5 cm, chartaceous, glabrous on both surfaces, lateral veins 7 to 9 pairs, the apex acute to acuminate, the margin doubly serrate, the base cuneate; petiolule of terminal leaflet 0.5 cm long, glabrous; petiole ca. 8 cm long, glabrous. Inflores-

cence of umbels arranged in a simple cyme at the end of long branches of the current year's growth, glabrous; pedicel 1 cm long, glabrous. Calyx dentate or obscure; petals 5; stamens 5, the filament 2.5 mm long; carpels 5 or 3 to 4, styles united into a single column, stigma indistinctly 5-lobed, sometimes 3- to 4-lobed, 1.5 mm long; ovary 2 mm long. Fruits globose, 5-angular when young, 8 mm long; the disc ca. 3 mm wide. Flowering August, fruiting October.

This species is restricted to Mt. Hwangshan, Anhui, China, at around 2000 m elevation and is named for the type locality. *Eleutherococcus huangshanensis* is most similar to *E. henryi* Oliver, *E. leucorrhizus* Oliver, and *E. setchuenensis* (Harms) Nakai. However, it differs from *E. henryi* by the glabrous nature of its inflorescence, twig, and abaxial leaf surfaces, and from *E. setchuenensis* by its chartaceous leaves with 5 leaflets and double serrate margins. This species is also distinguished from *E. leucorrhizus* by the shape, position, and number of prickles on its twigs. Characteristics of the prickles and also constancy in the number, shape, and pubescence of plant parts are usually important diagnostic features for evaluating species limits throughout the genus, and thus *E. huangshanensis* is sufficiently well distinguished from its allied species to be recognized as distinct. The three related species are distributed widely in China. However, *E. leucorrhizus* occurs in central and western China including Sichuan, Yunnan, Hubei, Gansu, and Shaanxi, and extending to Bhutan; *E. setchuenensis* is mainly found in central China; and *E. henryi* is distributed in central middle and eastern China centering on Hubei.

*Paratypes.* CHINA. **Anhui:** Wang Shan, 1800 m, 28 Aug. 1923, *N. K. Ip s.n.* (UC); Hwang Shan, 1900 m, 11 Aug. 1924, *K. Ling 1172* (UC); Wang Shan, 23 Sep. 1965, ? 779 (PE); Wang Shan, 1800 m, 14 Aug. 1973, *Zhou 474* (PE); Shexian, 18 Sep. 1987, *C. L. Huang 0253* (AAUF).

***Eleutherococcus pilosulus*** (Rehder) C. H. Kim & B.-Y. Sun, stat. nov. Basionym: *Acanthopanax giraldii* Harms var. *pilosulus* Rehder, *J. Arnold Arbor.* 9: 99. 1928. *Eleutherococcus giraldii* (Harms) Nakai var. *pilosulus* (Rehder) S. Y. Hu, *J. Arnold Arbor.* 61: 109. 1980. *Acanthopanax wilsonii* Harms var. *pilosulus* (Rehder) X. P. Fang & C. K. Hsieh, *Bull. Bot. Res., Harbin.* 7: 90. 1987. *Eleutherococcus wilsonii* (Harms) Nakai var. *pilosulus* (Rehder) P. S. Hsu & S. L. Pan, *Sida* 15: 594. 1993. TYPE: China. Kansu: Upper Tebbu country, in willow scrub, with birches, along streams, 3350 m, July–Aug. 1925, *J. F. Rock 13106* (holotype, A; isotype, UC).

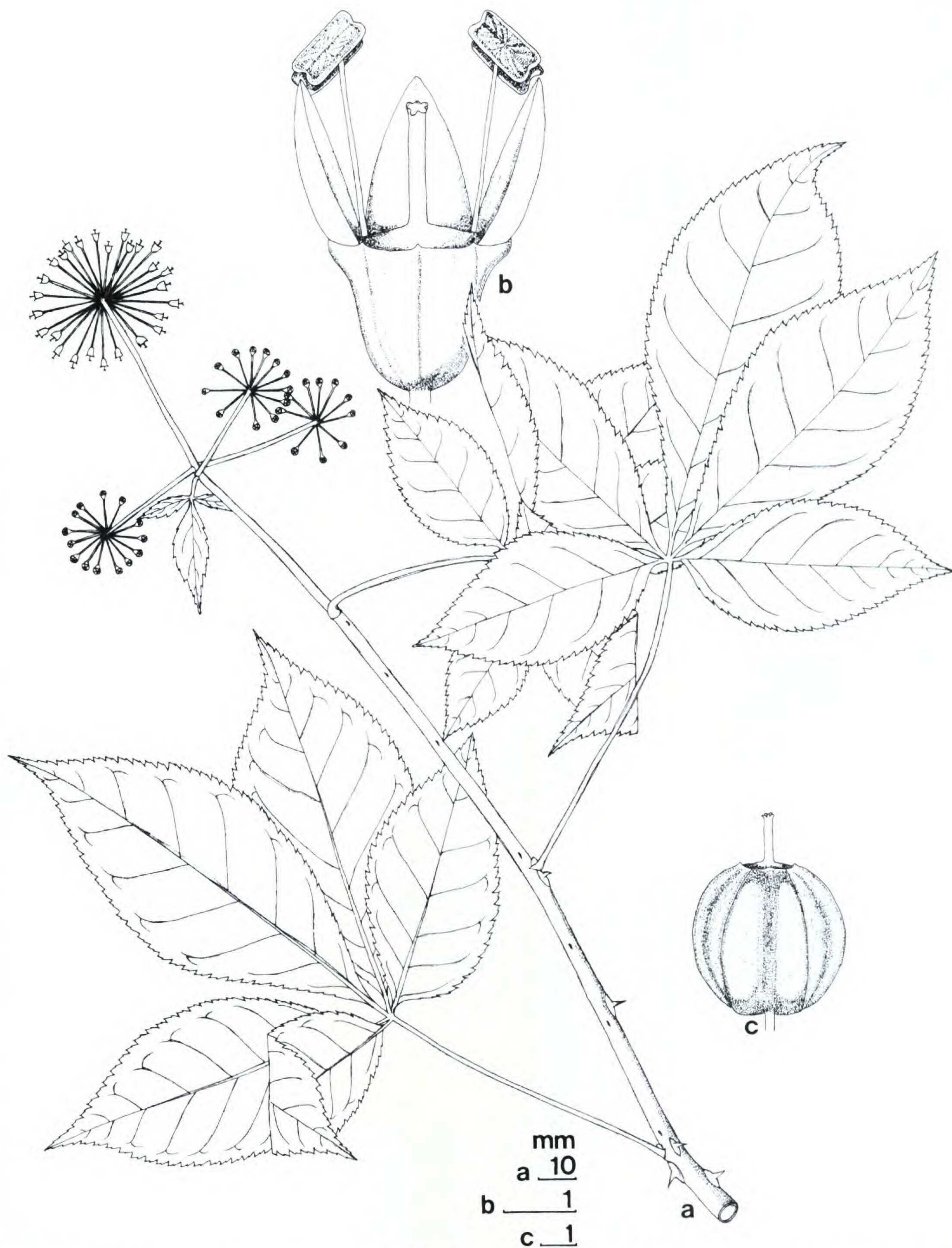


Figure 1. *Eleutherococcus huangshanensis* C. H. Kim & B.-Y. Sun. —a. Habit, flowering branch. —b. Flower with two petals and three stamens removed. —c. Fruit. (a, b from Zhou 474; c from W. C. Cheng 4146.)

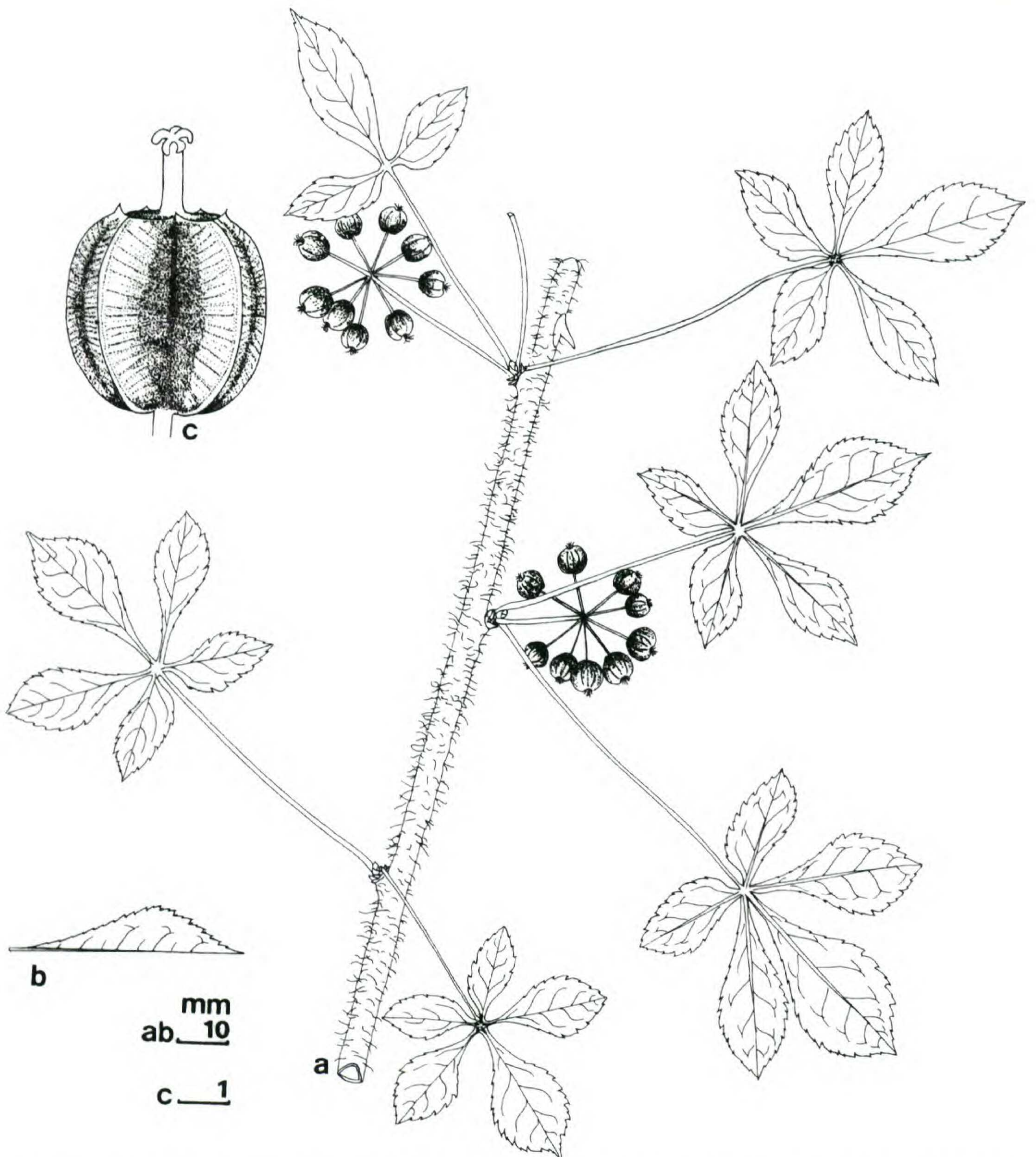


Figure 2. *Eleutherococcus pseudosetulosus* C. H. Kim & B.-Y. Sun. —a. Habit. —b. Abaxial surface of terminal leaflet. —c. Young fruit. (From D. E. Boufford & B. Bartholomew 24546.)

This species has previously been recognized as a variety of either *E. giraldii* or *E. wilsonii*. Comparison of these three taxa, however, shows that *E. pilosulus* has narrower leaflets, a densely pubescent abaxial leaf surface, and twigs with elastic prickles with an elliptically protuberant base. *Eleutherococcus giraldii* has glabrous leaflets and twigs with elastic prickles with an indistinct base, and *E. wilsonii* has glabrous leaflets and almost unarmed twigs. *Eleutherococcus pilosulus* is limited to north-

ern China, including Gansu and Qinghai, whereas *E. wilsonii* is distributed widely in China except the eastern part, and *E. giraldii* mainly occurs in Gansu, Hubei, and Shanxi, Shaanxi of upper middle China. On the basis of these characters, we therefore prefer to recognize *E. pilosulus* as a distinct species.

*Representative specimens.* CHINA. **Gansu (Kansu):** Hsia Mo K'ou, near Lichen, 2000–2300 m, 7 July 1923, R. C. Ching 337 (A, US); Taochow, SW of Tow river, Wm.

*Purdom* s.n. (A); Tao river basin, W of Adjuan, eastern Minshan range, 3050 m, 5 July 1925, *J. F. Rock* 12657 (A, C); Tianzhu, 2500 m, 14 July 1959, *He* 4834 (PE). **Qinghai:** Menyuan, 2500 m, 19 June 1960, *Qinghai-Gansu Exped.* 2687 (PE).

***Eleutherococcus pseudosetosus*** C. H. Kim & B.-Y. Sun, sp. nov. TYPE: China. Sichuan: Dujiangyan, Qishuping to Mashanping, upstream from the town of Longxi on the Longxi River, in thicket on open slope near *Cryptomeria* plantation, 1750 m, 4 Sep. 1988, *D. E. Boufford & B. Bartholomew* 24546 (holotype, BM; isotype, NY). Figure 2.

Frutex scandens; ramus internodio aliquantum setis densis, ca. 0.25 cm longis, aliquantum triangulis aculeis raris, ca. 0.4 cm longis, ca. 0.15 cm latis, nodi vel petioli basis absque aculeo. Pedunculi 17–42 mm, glabri; pedicelli 8–10 mm, glabri.

A dioecious shrub to 2 m tall; stems scandent, ± densely hirsute, trichomes slender and somewhat flexuous, 0.25 cm long, a few scattered prickles, prickles absent at node or below the petiole. Prickles pointing downward, broadened at base, 0.4 cm long, 0.15 cm wide. Leaves 5-foliolate; terminal leaflet obovate, 3.8–4.4 × 1.7–2 cm, slightly setose on adaxial surface, glabrous on abaxial surface, lateral veins 5 to 6 pairs, the apex acuminate, the margin doubly serrate, the base cuneate; petiolule of terminal leaflet 0–3 mm long; petiole 5.2–6.2 cm long, glabrous. Inflorescence a solitary umbel at the end of short branches of current year's growth; peduncle 1.7–4.2 cm long, glabrous; pedicel 0.8–1 cm long, glabrous. Calyx minutely 5-dentate; carpels 5, styles 5, connate to above middle, free arms recurved. Fruits widely globose, 6–7 mm long, black, 5-angular when young; the disc 1 mm wide. Fruiting September.

This species is restricted to Sichuan Province, China. The name is derived from the nature of the surface of its twigs, which resembles that of *E. setulosus* (Franchet) S. Y. Hu. *Eleutherococcus setulosus* and the new species described here are readily distinguishable from other members of the genus by their bristle-like elastic prickles at the internodes along the twigs. However, *E. pseudosetosus* differs from *E. setulosus* by its glabrous peduncle and pedicel, longer and sparser bristle-like prickles in the internodes, and the absence of nonelastic recurved prickles at the nodes. *Eleutherococcus setulosus* also occurs in Sichuan Province.

***Eleutherococcus pubescens*** (Pampanini) C. H. Kim & B.-Y. Sun, stat. nov. Basionym: *Acanthopanax spinosus* (L.f.) Miquel var. *pubescens* Pampanini, *Nuovo Giorn. Bot. Ital.* 2: 678. 1910. *Acanthopanax gracilistylus* W. W. Smith var. *pubescens* (Pampanini) H. L. Li, *Sargentia* 2: 85. 1942. *Eleutherococcus gracilistylus* (W. W. Smith) S. Y. Hu var. *pubescens* (Pampanini) S. Y. Hu, *J. Arnold Arbor.* 61: 109. 1980. TYPE: China. Hupeh: Monti di Ru-teen, ca. 700 m, Sep. 1906, *C. Silvestri* 1600 (lectotype, selected here, FI, A [photo]).

This species is similar to *E. gracilistylus* and *E. spinosus*, but differs from them in having sericeous hairs throughout the abaxial leaf surface rather than being glabrous, except with tufted hairs in the axil of the veins and setose trichomes along the midvein. These characteristics are constant throughout the species. *Eleutherococcus spinosus* is confined to the Japanese archipelago, whereas *E. gracilistylus* is distributed throughout China and on Cheju Island in Korea. Based on these differences, we prefer to recognize *E. pubescens* as a distinct species.

*Representative specimens.* CHINA. **Hubei (Hupeh):** Fan-sien, ca. 800 m, 20 May–3 June 1906, *C. Silvestri* 1598 (A[photo]); Wuchang, 23 Apr. 1933, *S. C. Sun* 1055, 1075 (A); Tung Chien Hsien, road side, 10 Aug. 1928, *H. G. Cheo* 183 (NY); Enshi, 1400 m, 22 June 1958, ? 24397 (NAS, PE); Yichang, 700–800 m, 7 May 1963, *Z. D. Jiang* 61 (PE). **Henan (Honan):** without precise locality, ? 20181 (PE). **Jiangsu (Kiangsu):** Nanking, 19 May 1921, *L. F. Tsu* 591 (UC). **Shanxi (Shansi):** Yuan Kiu Hsien, Ni Shan, 28 Sep. 1921, *Y. Hers* H-1824 (A). **Sichuan (Szechuan):** Le-po Hsien, 2800 m, 14 July 1934, *T. T. Yu* 3391 (PE).

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